


Date: Friday, 3/9/2007 10:31:03 AM  
 User: Kim Johnston

## Process Sheet

Customer : CU-DAR001 Dart Helicopters Services	Drawing Name : X-TUBE 412	
Job Number : 31142		
Estimate Number : 12727		
P.O. Number :	Part Number : D412664245	
This Issue : 3/9/2007 S.O. No. :	Drawing Number : D412-664-245 U/R	<i>OK 07.03.09</i>
Prsht Rev. : NC	Project Number : N/A	
First Issue : / / Type : LANDING GEAR	Drawing Revision : U/R	
Previous Run : 31141	Material :	
Written By :	Due Date : 4/6/2007	Qty: 1 Um: Each
Checked & Approved By : <i>07.03.09</i>		
Comment : Est Rev A New Issue 07-02-14 JLM		

## Additional Product

Job Number:



Seq. #:

Machine Or Operation:

Description :

1.0

D6009129

Crosstube Material



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6009-129 Crosstube *26548*

Check OD = 3.500"; ID = 2.250"

*SC 07.03.12**(1)*

2.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Photocopy bluefile &amp; type labels per PPPD412-664-205

CHG001

*SC 07/03/14*

3.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

Turn as per Dwg D412-664-245

*SC 07/03/14*

4.0

QC2

INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

*SC 07/03/14*

5.0

QC8

SECOND CHECK



Comment: SECOND CHECK

*SC 07.03.15**(1)*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Friday, 3/9/2007 10:31:04 AM  
User: Kim Johnston

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE 412

Job Number: 31142

Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description :

6.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Polish entire outside surface of crosstube

JB 7-3-16

7.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

DP 7-3-16

8.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

JB 7-3-16

9.0

QC3/5

INSPECT WORK/WING WALK



Comment: Inspect work & Chemical conversion Coat

DP 7-3-16

10.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010

EL 7-3-16

11.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

FT010

12.0

D36061

CUFF



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

CUFF

Batch: \_\_\_\_\_

13.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill Rivet holes as per Dwg D412-664-245

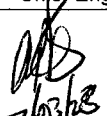
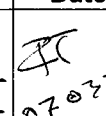
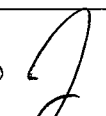
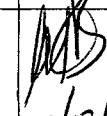
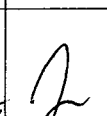
2-Drill pilot holes in tube as per Dwg D412-664-245

3-Ream hole to finish size in tube as per Dwg D412-664-245

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
070328	110	Top side of the tube cracked during bending.	 07/03/28 Jasior	Use the other side for programming band development.	 070328	 070328	 07/03/28 Jasior	 070328

NOTE: Date & initial all entries

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Drawing Name: X-TUBE 412

Job Number: 31142

Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description :

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-245

14.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat Tube & Cuffs as per QSI 005 4.1

15.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

16.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

17.0

OUTSIDE SERVICE

OUTSIDE SERVICES



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038Or

Issue P/O: \_\_\_\_\_ LPI as per ASTM 1417

Level 2 Attach copy of NDT results to work order

18.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage

Ensure copy of NDT results attached to work order.

19.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: Inspect for damage & ensure results are as per Dwg D412-664-203

20.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Rivet Cuffs as per Dwg D412-6647-245. with Sika flex in Between tube & Cuff

A/R SIKAFLEX -241/-291 BATCH: \_\_\_\_\_

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description :

21.0

CR3212406

CHERRY RIVET



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

CHERRY RIVET

Batch: \_\_\_\_\_

22.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

23.0

QC14

Inspect Spray Paint



Comment: Inspect Spray Paint

Wrap in plastic bag to protect from scratches

24.0

D31891

Chafing Shield



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Chafing Shield

Batch: \_\_\_\_\_

25.0

D3595

Rubber Cushion (per sq ft)



Comment: Qty.: 0.0536 sf(s)/Unit Total : 0.0536 sf(s)

Rubber Cushion

Cut to .630" X 5.8" X 2PCS

Batch: \_\_\_\_\_

26.0

D28961

Support



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D2896-1 Support \_\_\_\_\_

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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Job Number: 31142

Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description :

27.0

D2856600

Abrasion Strip



Comment: Qty.: 0.9450 f(s)/Unit Total : 0.9450 f(s)

Abrasion Strip

2 X D2856-600-1009

Batch: \_\_\_\_\_

28.0

MS2192028

Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-28 Clamp \_\_\_\_\_

29.0

MS2192032

clamp(per MIL-DTL-8783C)



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

clamp(per MIL-DTL-8783C)

batch: \_\_\_\_\_

30.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

Assemble as per Dwg D412-664-245

Install Chaffing Sheilds

Instal support with magnobond 6398 per dwg D412-664-245,  
cure for 12hrs before packaging.

Time & date of application: \_\_\_\_\_

Batch: \_\_\_\_\_

31.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

32.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D412-664-205

**POSITIVE RECALL**

EFFECTIVE 07.03.07 AUTH GP

RELEASED \_\_\_\_\_ DATE \_\_\_\_\_

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

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Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE 412

Job Number: 31142

Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description :

\*\*\*\*\*Ensure tube is not packaged if curing time is less than 12 hrs, see step 27 for application time & date  
\*\*\*\*\*

Time & date of packaging: \_\_\_\_\_

Location: \_\_\_\_\_

PPP Rev: \_\_\_\_\_

33.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



*U 21-25*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



DESIGN 9P	DRAWN BY 9P	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED #	APPROVED #	DRAWING NO. D412-664-245	REV. B SHEET 1 OF 3
DATE 07.03.01		TITLE CROSSTUBE ASS'Y (412 LOW-N AFT) NTS	
A	06.12.01	NEW ISSUE	
B	07.03.01	CHG CUFF AREA, CHG RUBBER CUSHION	

PRELIMINARY ISSUE

**PARTS LIST:**

Qty	Part Number	Description
X	D412-664-245	CROSSTUBE ASSEMBLY (412 LOW-NARROW AFT)
1	D6009-129	CROSSTUBE
2	D2856-600-1009	ABRASION STRIP
1	D2896-1	SUPPORT
2	D3189-1	CHAFING SHIELD
2	D3595-063-580	RUBBER CUSHION
2	D3606-1	CUFF
44	CR3212-4-06	RIVET (OR M7885/3-4-06)
4	MS21920-28	CLAMP
2	MS21920-32	CLAMP
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

**GENERAL NOTES:**

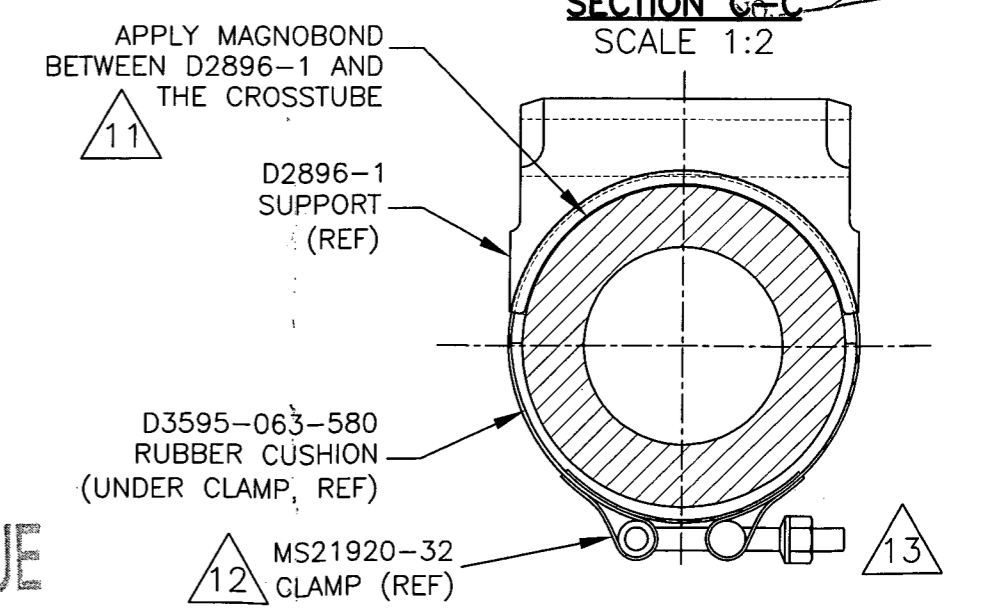
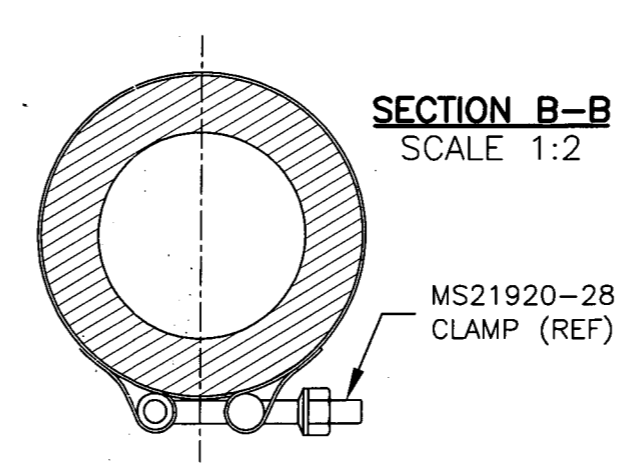
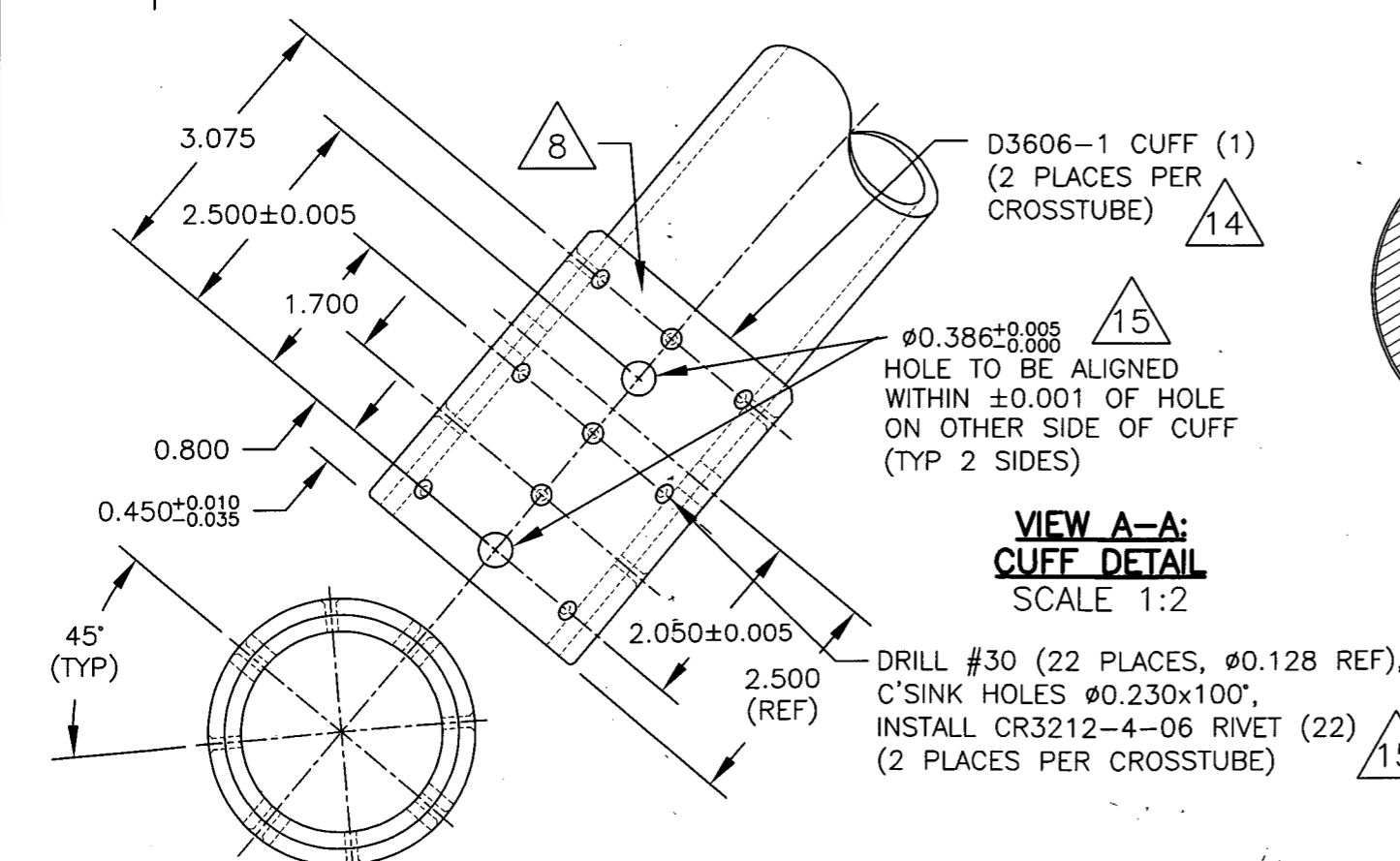
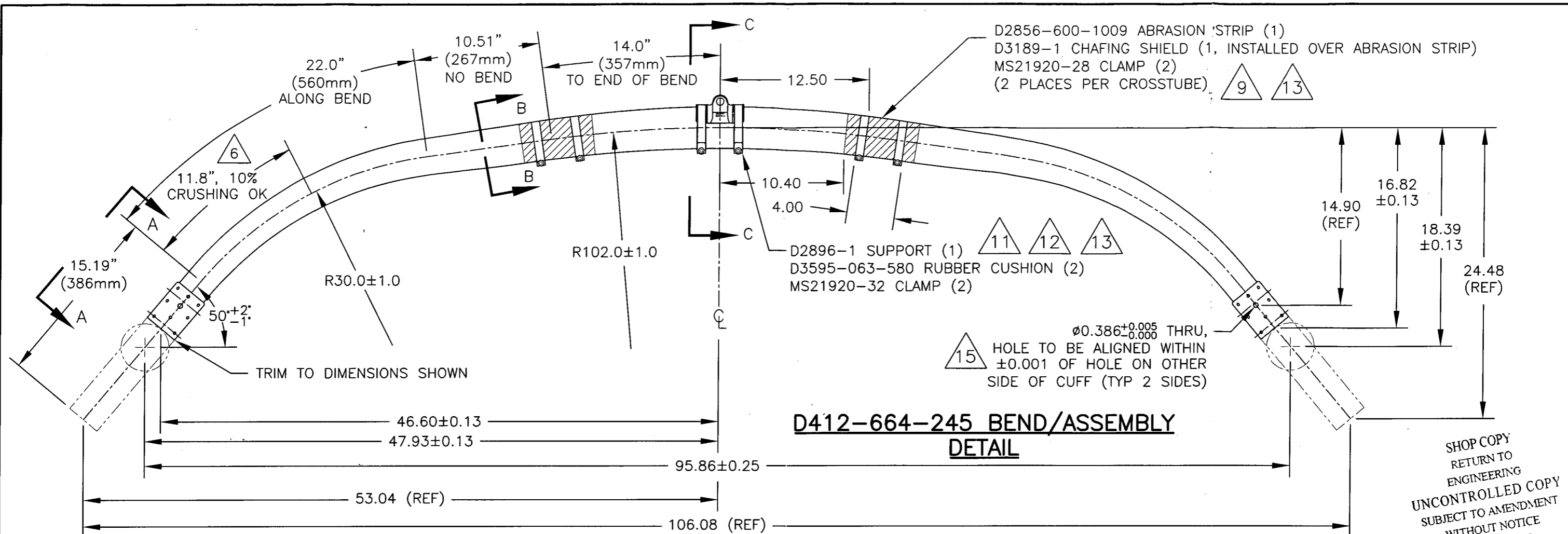
- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6009-129  
FINISHED LENGTH = 123.59±0.020 (BEFORE BENDING/TRIMMING)
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-600-1009 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-32 CLAMPS WITH D3595-063-580 RUBBER CUSHIONS TO SECURE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB.
- 14) INSTALL D3606-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE.
- 15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
BETWEEN TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 31142

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**PRELIMINARY ISSUE**

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		DATE		DRAWING NO.	REV. B
		07.03.01		D412-664-245	SHEET 2 OF 3
				TITLE	SCALE
				CROSSTUBE (412 LOW-NARROW AFT)	1:8



<b>DART AEROSPACE LTD</b>		<b>Work Order:</b>	
<b>Description:</b> <i>R-Tube</i>		<b>Part Number:</b>	<i>Dart-66-1-2-5</i>
<b>Inspection Dwg:</b> <i>Dart-66-1-2-5</i> <b>Rev:</b> <i>B</i>		<b>Page 1 of 1</b>	

### FIRST ARTICLE INSPECTION CHECKLIST



First Article



Prototype

Inspection Sheet Drawing Dimension		Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
A	2.612	<i>±.005 -0.006</i>	<i>2.612</i>	✓			
B	2.726	"	<i>2.726</i>	✓			
C	2.855	"	<i>2.855</i>	✓			
D	2.994	"	<i>2.994</i>	✓			
E	3.134	"	<i>3.134</i>	✓			
F	3.256	"	<i>3.256</i>				
G	3.500	<i>stock REF</i>	<i>3.500</i>	✓			
H	<i>123.588</i>	<i>±.02</i>	<i>123.588</i>	✓			
I							
J	2.612	<i>±.005 -0.006</i>	<i>2.612</i>	✓			
K	2.726	"	<i>2.726</i>	✓			
L	2.855	"	<i>2.855</i>	✓			
M	2.994	"	<i>2.994</i>	✓			
N	3.134	"	<i>3.134</i>	✓			
O	3.256	"	<i>3.256</i>	✓			
P	3.500	"	<i>3.500</i>	✓			
Q							
R							
S							
T							
U							
V							
W							
X							
Y							

<b>Measured by:</b> <i>Q.F.</i>	<b>Audited by:</b> <i>RF</i>	<b>Prototype Approval:</b>	N/A
<b>Date:</b> <i>07/02/14</i>	<b>Date:</b> <i>07-03-15</i>	<b>Date:</b>	N/A

<b>Rev</b>	<b>Date</b>	<b>Change</b>	<b>Revised by</b>	<b>Approved</b>
		New Issue	KJ/RF	

